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# MULTIMEDIA UNIVERSITY

## FINAL EXAMINATION

TRIMESTER 1, 2018/2019

### **EES3016 – ENGINEER AND SOCIETY** (All Section / Groups)

16 OCTOBER 2018  
2.30 p.m. – 4.30 p.m.  
(2 Hours)

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#### **INSTRUCTIONS TO STUDENTS**

1. This Question paper consists of 7 pages (including the cover page and Appendix A) with 5 Questions only.
2. Attempt all of the **FIVE** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please write all your answers in the Answer Booklet provided.

**Question 1**

(a) Purchasing Power of Parity (PPP) is an indicator of a country's development.

(i) Describe what it is Purchasing Power of Parity. [2 marks]

(ii) Discuss ONE factor that must be considered if PPP is to be used as an indicator to compare the economies of two countries. [2 marks]

(b) Describe the importance of broadband as a social indicator of development. [3 marks]

(c) Discuss TWO limitations in achieving technology development in a country. [ 3 marks]

(d) Describe TWO roles of engineers in environment conservation. [ 4 marks]

(e) *Environmental reports describe that are nearly 5 trillion plastic pieces are afloat in the world's ocean.*

Discuss the negative impacts from the phenomenon above. [ 3 marks]

(f) Discuss TWO negative impacts of global climate change on humankind. [3 marks]

**Continued .....**

**Question 2**

(a) Discuss TWO importance of understanding technology in the top management.  
[4 marks]

(b) Describe in detail TWO dimensions in innovation.  
[4 marks]

(c) Discuss TWO benefits to the global trade community due to the monitoring of the World Trade Organization.  
[4 marks]

(d) The Washington Accord has played a significant role in making engineering a borderless trade. Discuss.  
[4 marks]

(e) Discuss TWO advantages of the General Agreement on Trade in Services (GATS).  
[4 marks]

**Continued .....**

**Question 3**

You are the lead engineer in a power plant. The maintenance of the boiler system requires the engineers and maintenance crew to remove the sludge discharged from the boiler thoroughly. However, due to space constraints, the task has to be done manually.

(a) Based on the Occupational Safety and Health Act (OHS), discuss FOUR roles of an employer in explaining to the crew the impacts / scenarios that it could lead to, if occupational health regulations are not followed. [12 marks]

(b) The power plant needs heavy lifting to be performed to remove the sludge from the bottom of the boiler.

The Recommended Weight Limit (RWL) is given as:

$$RWL = LC \times HM \times VM \times DM \times AM \times FM \times CM$$

where LC is the load constant (23 kg) and other factors in the equation are as given in Appendix A.

Calculate the RWL in this working scenario.

Set the moving distance on the site, where the total distance to dispose the sludge is at least 30 m from the bottom of the boiler. Assume default position if lifting is done under normal working position.

[8 marks]

**Question 4**

(a) You are the drilling service engineer who will conduct a nuclear tool operation on a land rig.

(i) Discuss the ethical measures for the operation of ionizing radiative equipment. [10 marks]

(ii) Discuss ONE safety standard during the operation of the above. [2 marks]

(b) Discuss FOUR roles of the Board of Engineers Malaysia (BEM). [8 marks]

Continued .....

**Question 5**

You are given a task to perform calibration on an open space picosecond pulses using 850nm Infrared laser. The objective of this task is to align the laser beam to hit the target at micrometer accuracy.

(a) As a laboratory supervisor, discuss in detail THREE ethical issues related to tasks and safety in non-ionising radiation equipment.

[12 marks]

(b) Citing FOUR suitable Code of Engineering Ethics, discuss the need to follow engineering ethics in Research and Development (R&D).

[8 marks]

**End of Paper**

## Appendix A

The equation is:

$$LC \times HM \times VM \times DM \times AM \times FM \times CM = RWL$$

where LC is the load constant (23 kg) and other factors in the equation are:

HM, the Horizontal Multiplier factor

VM, the Vertical Multiplier factor

DM, the Distance Multiplier factor

FM, the Frequency Multiplier factor

AM, the Asymmetric Multiplier factor

CM, the Coupling Multiplier factor

RWL, the Recommended Weight Limit

For each value, look up the corresponding factor and use this number in the equation.

Horizontal Multiplier (HM): Horizontal distance (H, in cm) from the midpoint between the ankles to the hands while holding the object.

H = Horizontal Distance (cm)	HM Factor
25 or less	1.00
30	0.83
40	0.63
50	0.50
60	0.42

Vertical Multiplier (VM): The vertical distance (V, in cm) of the hands from the ground at the start of the lift.

V = Starting Height (cm)	VM Factor
0	0.78
30	0.87
50	0.93
70	0.99
100	0.93
150	0.78
175	0.70
>175	0.00

**Appendix A Continued .....**

Distance Multiplier (DM): The vertical distance (D, in cm) that the load travels.

D = Lifting Distance (cm)	DM Factor
25 or less	1.00
40	0.93
55	0.90
100	0.87
145	0.85
175	0.85
>175	0.00

Asymmetric Multiplier (AM): The twisting angle (A) of the body while lifting, measured in degrees.

A = Angle (degrees)	AM Factor
90°	0.71
60°	0.81
45°	0.86
30°	0.90
0°	1.00 (default)

Frequency Multiplier (FM): The frequency (F) of lifts and the duration of lifting (in minutes or seconds) over a workshift.

F = Time Between Lifts

FM Factor

Between Lifts	FM Factor			
	Lifting While Standing:		OR Lifting While Stooping:	
	One Hour or Less	Over One Hour	One Hour or Less	Over One Hour
5 min	1.00	0.85	1.00	0.85
1 min	0.94	0.75	0.94	0.75
30 sec	0.91	0.65	0.91	0.65
15 sec	0.84	0.45	0.84	0.45
10 sec	0.75 (default)	0.27	0.75	0.27
6 sec	0.45	0.13	0.45	-
5 sec	0.37	-	0.37	-

Coupling Multiplier (CM): The quality of grasp (or coupling, C) classified as good, fair or poor and depends on the body position (either standing or stooping).

C = Grasp

CM Factor: Standing

= Grasp	CM Factor:	
	Standing	Stooping
Good (handles)	1.00 (default)	1.00
Fair	1.00	0.95
Poor	0.90	0.90

End of Appendix A